

# LESSTHAN Function

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Returns `true` if the first argument is less than but not equal to the second argument. Equivalent to the `<` operator.

- Each argument can be a literal Integer or Decimal number, a function returning a number, or a reference to a column containing numbers.

Since the function returns a Boolean value, it can be used as a function or a conditional.

**NOTE:** Within an expression, you might choose to use the corresponding operator, instead of this function. For more information, see *Comparison Operators*.

**Wrangle vs. SQL:** This function is part of Wrangle , a proprietary data transformation language. Wrangle is not SQL. For more information, see *Wrangle Language*.

## Basic Usage

```
lessthan(Errors, 10)
```

**Output:** Returns `true` when the value in the `Errors` column is less than 10.

## Syntax and Arguments

```
lessthan(value1, value2)
```

Argument	Required?	Data Type	Description
value1	Y	string	The first value. This can be a number, a function returning a number, or a column containing numbers.
value2	Y	string	The second value. This can be a number, a function returning a number, or a column containing numbers.

For more information on syntax standards, see *Language Documentation Syntax Notes*.

## value1, value2

Names of the column, expressions, or literals to compare.

- Missing values generate missing string results.

**Usage Notes:**

Required?	Data Type	Example Value
Yes	Column reference, function, or numeric or String value	myColumn

**Examples**

**Tip:** For additional examples, see *Common Tasks*.

**Example - Basic Comparison Functions**

This simple example demonstrate available comparison functions:

- **LESSTHAN** - See *LESSTHAN Function*.
- **LESSTHANEQUAL** - See *LESSTHANEQUAL Function*.
- **EQUAL** - See *EQUAL Function*.
- **NOTEQUAL** - See *NOTEQUAL Function*.
- **GREATERTHAN** - See *GREATERTHAN Function*.
- **GREATERTHANEQUAL** - See *GREATERTHANEQUAL Function*.

**Source:**

colA	colB
1	11
2	10
3	9
4	8
5	7
6	6
7	5
8	4
9	3
10	2
11	1

**Transformation:**

Add the following transforms to your recipe, one for each comparison function:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	LESSTHAN(colA, colB)

<b>Parameter: New column name</b>	'lt'
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<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	LESSTHANEQUAL(colA, colB)
<b>Parameter: New column name</b>	'lte'

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	EQUAL(colA, colB)
<b>Parameter: New column name</b>	'eq'

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	NOTEQUAL(colA, colB)
<b>Parameter: New column name</b>	'neq'

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	GREATERTHAN(colA, colB)
<b>Parameter: New column name</b>	'gt'

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	GREATERTHANEQUAL(colA, colB)
<b>Parameter: New column name</b>	'gte'

**Results:**

colA	colB	gte	gt	neq	eq	lte	lt
1	11	false	false	true	false	true	true
2	10	false	false	true	false	true	true
3	9	false	false	true	false	true	true
4	8	false	false	true	false	true	true
5	7	false	false	true	false	true	true

6	6	true	false	false	true	true	false
7	5	true	true	true	false	false	false
8	4	true	true	true	false	false	false
9	3	true	true	true	false	false	false
10	2	true	true	true	false	false	false
11	1	true	true	true	false	false	false

### Example - Using Comparisons to Test Ranges

In the town of Circleville, citizens are allowed to maintain a single crop circle in their backyard, as long as it confirms to the town regulations. Below is some data on the size of crop circles in town, with a separate entry for each home. Limits are displayed in the adjacent columns, with the `inclusive` columns indicating whether the minimum or maximum values are inclusive.

**Tip:** As part of this exercise, you can see how to you can extend your recipe to perform some simple financial analysis of the data.

#### Source:

Location	Radius_ft	minRadius_ft	minInclusive	maxRadius_ft	maxInclusive
House1	55.5	10	Y	25	N
House2	12	10	Y	25	N
House3	14.25	10	Y	25	N
House4	3.5	10	Y	25	N
House5	27	10	Y	25	N

#### Transformation:

After the data is loaded into the Transformer page, you can begin comparing column values:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	LESSTHANEQUAL(Radius_ft,minRadius_ft)
<b>Parameter: New column name</b>	'tooSmall'

While accurate, the above transform does not account for the `minInclusive` value, which may be changed as part of your steps. Instead, you can delete the previous transform and use the following, which factors in the other column:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	IF(minInclusive == 'Y',LESSTHANEQUAL(Radius_ft,minRadius_ft),LESSTHAN(Radius_ft,minRadius_ft))
<b>Parameter: New column name</b>	'tooSmall'

In this case, the IF function tests whether the minimum value is inclusive (values of 10 are allowed). If so, the LESSTHANEQUAL function is applied. Otherwise, the LESSTHAN function is applied. For the maximum limit, the following step applies:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	IF(maxInclusive == 'Y', GREATERTHANEQUAL(Radius_ft, maxRadius_ft), GREATERTHAN(Radius_ft, maxRadius_ft))
<b>Parameter: New column name</b>	'tooBig'

Now, you can do some analysis of this data. First, you can insert a column containing the amount of the fine per foot above the maximum or below the minimum. Before the first derive command, insert the following, which is the fine (\$15.00) for each foot above or below the limits:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	15
<b>Parameter: New column name</b>	'fineDollarsPerFt'

At the end of the recipe, add the following new line, which calculates the fine for crop circles that are too small:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	IF(tooSmall == 'true', (minRadius_ft - Radius_ft) * fineDollarsPerFt, 0.0)
<b>Parameter: New column name</b>	'fine_Dollars'

The above captures the too-small violations. To also capture the too-big violations, change the above to the following:

<b>Transformation Name</b>	New formula
<b>Parameter: Formula type</b>	Single row formula
<b>Parameter: Formula</b>	IF(tooSmall == 'true', (minRadius_ft - Radius_ft) * fineDollarsPerFt, if(tooBig == 'true', (Radius_ft - maxRadius_ft) * fineDollarsPerFt, '0.0'))
<b>Parameter: New column name</b>	'fine_Dollars'

In place of the original "false" expression (0.0), the above adds the test for the too-big values, so that all fines are included in a single column. You can reformat the `fine_Dollars` column to be in dollar format:

<b>Transformation Name</b>	Edit column with formula
<b>Parameter: Columns</b>	<code>fine_Dollars</code>
<b>Parameter: Formula</b>	<code>NUMFORMAT(fine_Dollars, '\$###.00')</code>

**Results:**

After you delete the columns used in the calculation and move the remaining ones, you should end up with a dataset similar to the following:

Location	fineDollarsPerFt	Radius_ft	minRadius_ft	minInclusive	maxRadius_ft	maxInclusive	fineDollars
House1	15	55.5	10	Y	25	N	\$457.50
House2	15	12	10	Y	25	N	\$0.00
House3	15	14.25	10	Y	25	N	\$0.00
House4	15	3.5	10	Y	25	N	\$97.50
House5	15	27	10	Y	25	N	\$30.00

Now that you have created all of the computations for generating these values, you can change values for `minRadius_ft`, `maxRadius_ft`, and `fineDollarsPerFt` to analyze the resulting fine revenue. Before or after the transform where you set the value for `fineDollarsPerFt`, you can insert something like the following:

<b>Transformation Name</b>	Edit column with formula
<b>Parameter: Columns</b>	<code>minRadius_ft</code>
<b>Parameter: Formula</b>	<code>'12.5'</code>

After the step is added, select the last line in the recipe. Then, you can see how the values in the `fineDollars` column have been updated.